Effectiveness of Functional Electrical Stimulation – Cycling Treatment in Children with Cerebral Palsy

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Cerebral palsy is a disability characterized by non-progressive motor dysfunction that affects muscle tone, posture and movement. This study was conducted to examine the effects of electrical stimulation on children with CP. Motor function, gait pattern, spasticity (stiff muscles resulting in awkward movement), (execution of) activities of daily living and aerobic capacity were evaluated.

The study included 25 children (11 girls, 14 boys), ages 4-12, receiving muscular botulinum toxin (botox) injections and undergoing standard physical therapy-type treatments. The study participants were split into 3 groups – 1) electrical stimulation* + cycling + standard treatment, 2) cycling + standard treatment, 3) standard treatment alone (*pulse width = 250-300 microseconds, frequency = 30-45 Hz, intensity = 100, time of impulse = 7 seconds). All groups received 1 hour of standard treatment, 5 days a week for 4 weeks. Additionally, the electrical stimulation group received 30 minutes of treatment, and the cycling + standard group completed 30 minutes of cycling.

The results showed significant improvement in motor function, gait, spasticity, daily living activities and aerobic capacity across all groups. Greater improvement was seen in spasticity of both ankles and adductors (muscle used to bring the legs in towards the body) in the group that participated in functional electrical stimulation than in the other two.

While the study combined standard CP treatment protocol, cycling, botox AND electrical stimulation, the improvement in measured variables shows promise in the utilization of electrical muscle stimulation in general. This study, plus others, have found that this treatment method is well tolerated by children. Studies have also shown that electrical muscle stimulation protocols have resulted in various significant physiological benefits including increased muscle size, reduced spasticity and improved neurological and functional performance.